Florida Department of Environmental Protection

Water Quality Restoration Program

Upper Ocklawaha Basin Priority Waterbody Reductions

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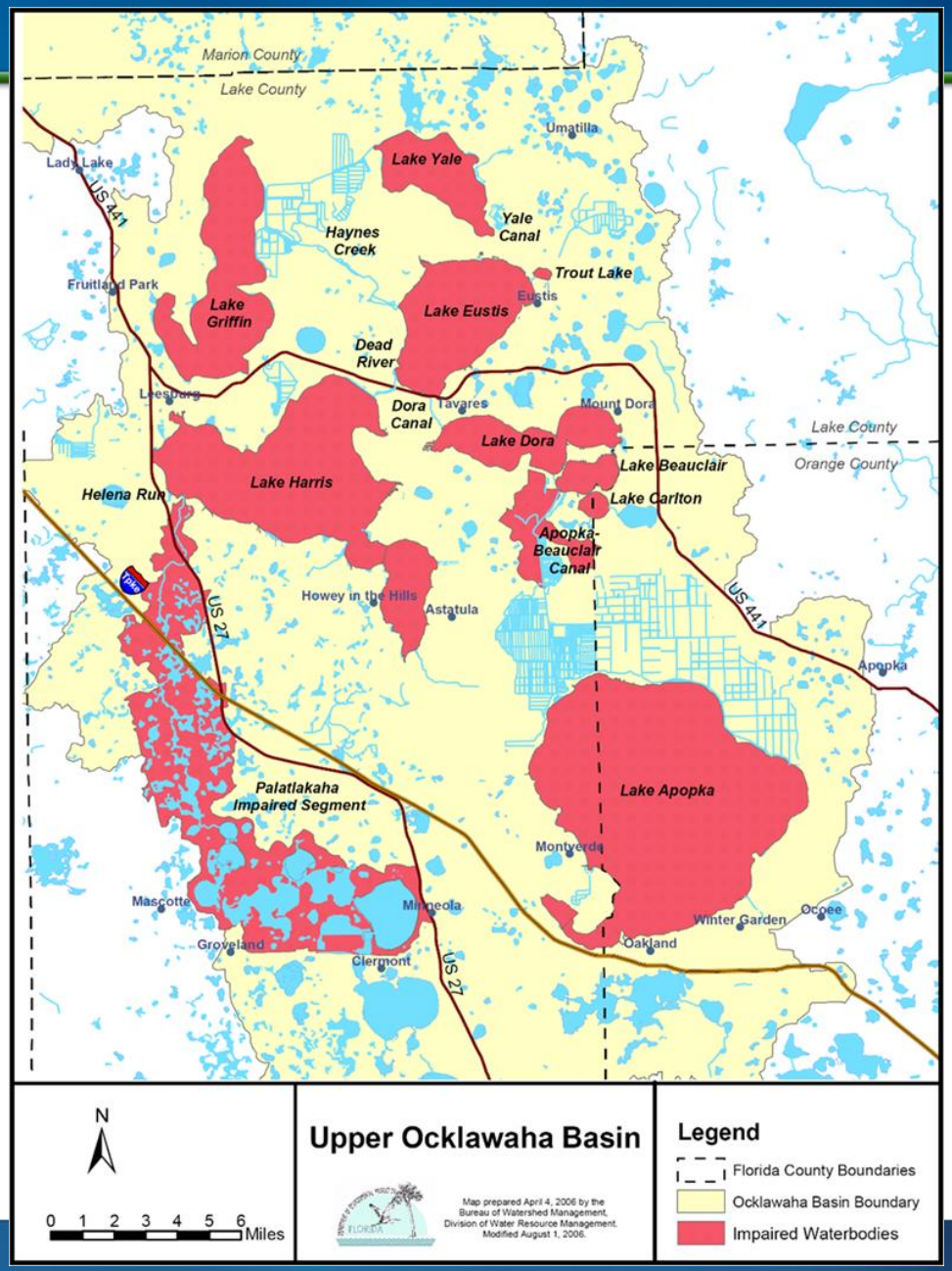
Priority Waterbodies

- Lake Harris.
- Trout Lake.
- Lake Carlton.
- Lake Yale.
- Palatlakaha River.



Apportionment Concept

- Start with individual Total Maximum Daily Load (TMDL) models.
- Apportion reductions of Total Phosphorus (TP) loading.
  - Relates to the TMDLs, but also uses models and tools developed for each basin.
  - Calculate reductions for local governments and Florida Department of Transportation (FDOT).
  - Agricultural reductions are based on Best Management Practice (BMP) implementation.
- Consider connection of lakes.
  - Loading transport losses and gains.

General Apportionment Approach

- Equitable approach.
  - Approach does not favor or burden any one stakeholder relative to another.
  - Previous stormwater projects/efforts are accounted for.
- Based on the area of each jurisdiction and proportion of developed land uses loading derived from that area.
- Local governments are not responsible for loads from agriculture or historic muck farm restoration areas or natural lands; those are separated from the local developed land use loads.

Palatlakaha River Loading

- Aggregated TMDL land use modeling results:
  - Developed land uses:
    - Residential, communication/transportation, and urban open land.
  - Natural areas:
    - Forest, rural open, rangeland, open water/ wetlands.
  - Agriculture (all types).

Palatlakaha River Loadings

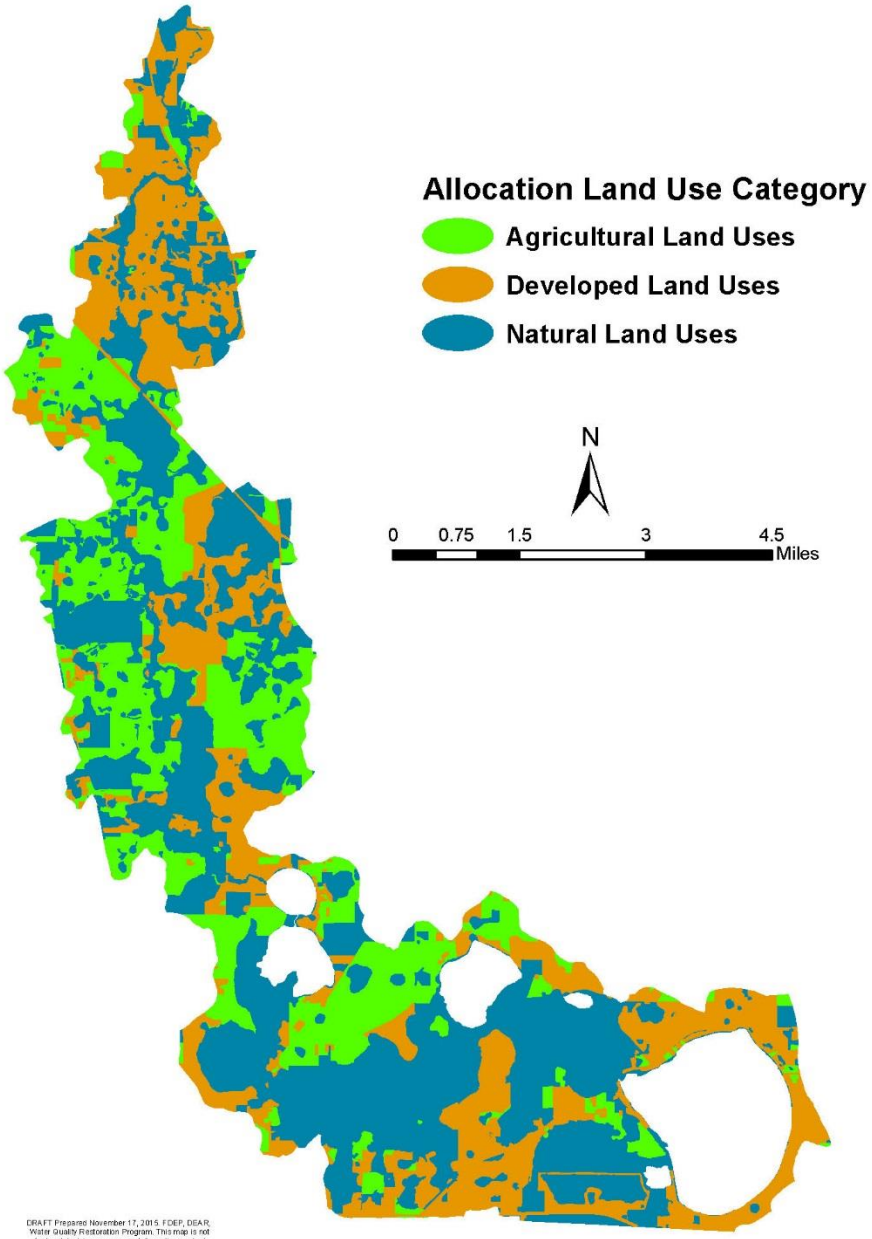
- TP TMDL = 2,207 pounds per year (lbs/yr)
- TP loading from 2009 land use = 2,769 lbs/yr
- TP reduction needed = 562 lbs/yr

Loading Distribution

Category	2009 TP Load (lbs/yr), by Source Category
Developed Land Uses	1,305.6
Agriculture	414.5
Natural Areas	1,048.8
Total 2009 Estimated Developed Land Use Loads	1,720.1

- Septic system loading is implicit in developed land uses.

Palatlakaha Allocation Land Use Categories



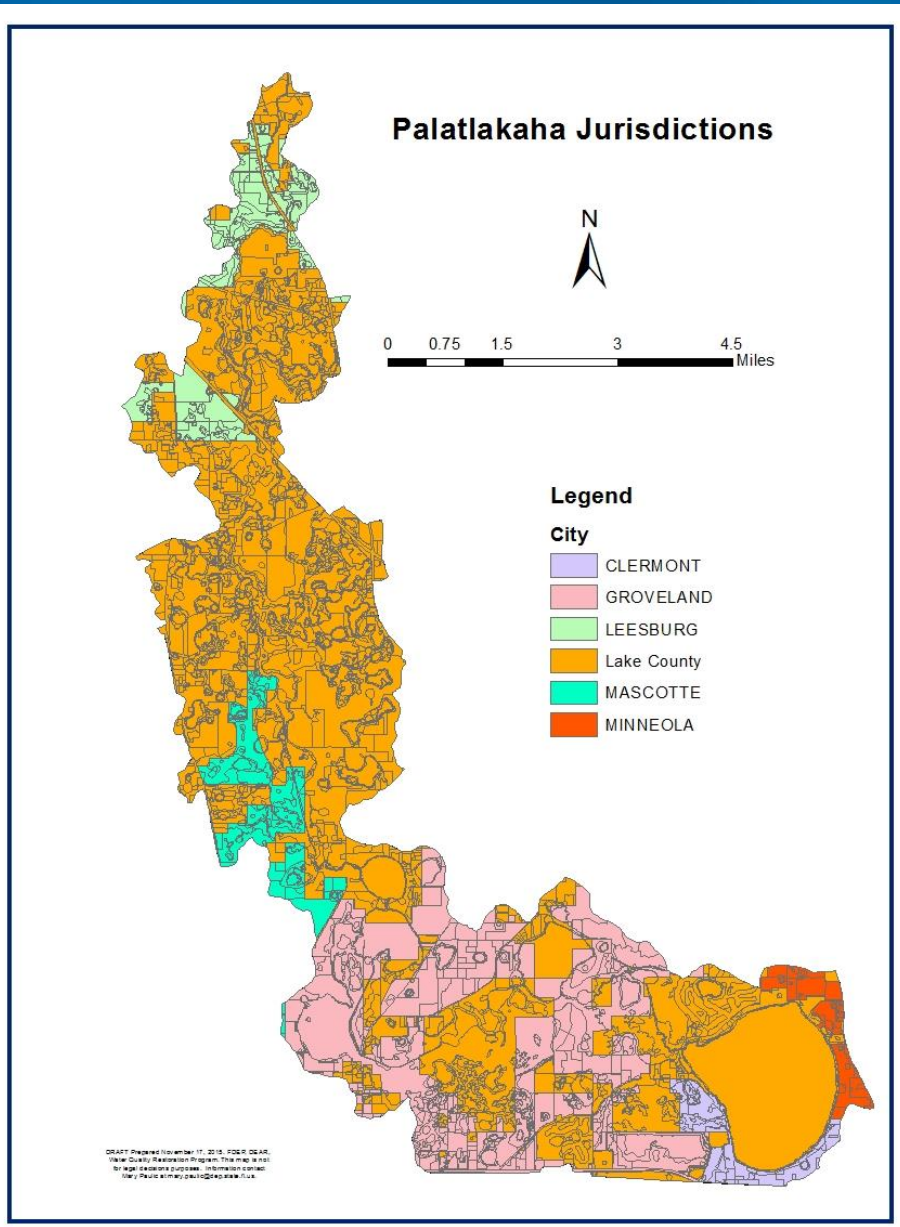
Distribution of Land Use

Acres of Modeled Land Uses by City in the Palatlakaha Basin (WBID 2839).				
City	Percent Agriculture	Percent Developed	Percent Natural	Total
Clermont	0.36	1.06	0.84	2.25
Groveland	5.47	6.00	12.06	23.54
Lake County	14.47	19.31	28.28	62.05
Leesburg	2.26	1.70	1.44	5.40
Mascotte	2.10	0.16	2.57	4.84
Minneola	0.05	1.62	0.24	1.91
Total	24.71	29.86	45.43	100.00

Calculations for Jurisdictions

- Using the land uses, add jurisdictional boundaries.
  - Clermont, Groveland, Leesburg, Mascotte, Minneola, and Lake County.
  - No FDOT area within the waterbody identification (WBID) area boundary.
- Calculate area of developed land use for the entire watershed.
- Calculate developed land use area (acres) within each jurisdiction.
- Calculate each jurisdiction's percent of the total area of developed land use.
  - This percent used to apportion reduction in TP loading required by that jurisdiction.

Jurisdictional Areas



Land Use Categories

City/Town/ County	Percent Agriculture	Percent Developed	Percent Natural	Total Percent
Clermont	0.36	1.06	0.84	**2.25**
Groveland	5.47	6.00	12.06	**23.54**
Lake County	14.47	19.31	28.28	**62.05**
Leesburg	2.26	1.70	1.44	**5.40**
Mascotte	2.10	0.16	2.57	**4.84**
Minneola	0.05	1.62	0.24	**1.91**
Total	**24.71**	**29.86**	**45.43**	**100.00**

Percent of Developed Area, by Jurisdiction

Local Jurisdiction	Acres Developed/ Urban	Portion of Total Developed Acres in Basin	Percent of Developed Acres Within Jurisdiction
Clermont	258.24	0.0371	3.71%
Groveland	1462.55	0.2102	21.02%
Lake County	4703.65	0.6760	67.60%
Leesburg	414.16	0.0595	5.95%
Mascotte	39.72	0.0057	0.57%
Minneola	80.24	0.0115	1.15%
Total	**6,958.57**	**-**	**100 %**

Apportion Loading

- Remove project credits.
- Apportion 2009 loading among developed land uses and agriculture.
  - Technigue removes non controllable land uses for consideration of loading reductions.

Table

Sources of Total Phosphorus (loading in lbs/yr)	TMDL Baseline loading (1991-2000)	Estimated load change from current projects (through 2005)	Estimated load change from future projects (2005 on)	Estimated load change from growth (2009 land uses)	Net estimated TP load	TMDL Controllable baseline loading	Controllable baseline % contribution	Proportional reduction needed to meet TMDL
Atmospheric deposition (wet/dry)								
Point sources								
Stormwater runoff								
Natural area runoff	1293			-244	1049			
Agricultural runoff	370			44	414	414	24.1%	135.3
Runoff from developed uses	687			619	1306	1306	75.9%	426.7
PAL14 Big Creek US27-basin 1								
Seepage/groundwater								
Septic tanks								
PAL10 Village Estates sewer connection								
PAL11 Groveland septic tank prohibition								
Loading information								
Baseline and net TP-loading (lbs/yr)	2350	0	0	419	2769			
Total Maximum Daily Load (lbs/yr)	2207				2207			
Additional reduction needed in TP-loading to meet TMDL (lbs/yr)	143				562			562
Additional percent reduction in TP-loading needed to meet TMDL					25.5%			

Calculate Reduction

City/Town/ County	Acres Developed	Percent Developed	TP Reductions Needed from Developed Land Uses (lbs/yr)	TP Reduction Required for Developed Land Uses (lbs /yr)
Clermont	258.24	3.71%	426.7	15.8
Groveland	1462.55	21.02%	426.7	89.7
Lake County	4703.65	67.60%	426.7	288.4
Leesburg	414.16	5.95%	426.7	25.4
Mascotte	39.72	0.57%	426.7	2.4
Minneola	80.24	1.15%	426.7	4.9
Total	**6,958.57**	**100%**	**-**	**426.7**

Trout Lake, Lake Carlton, Lake Harris, and Lake Yale

TMDL Summary

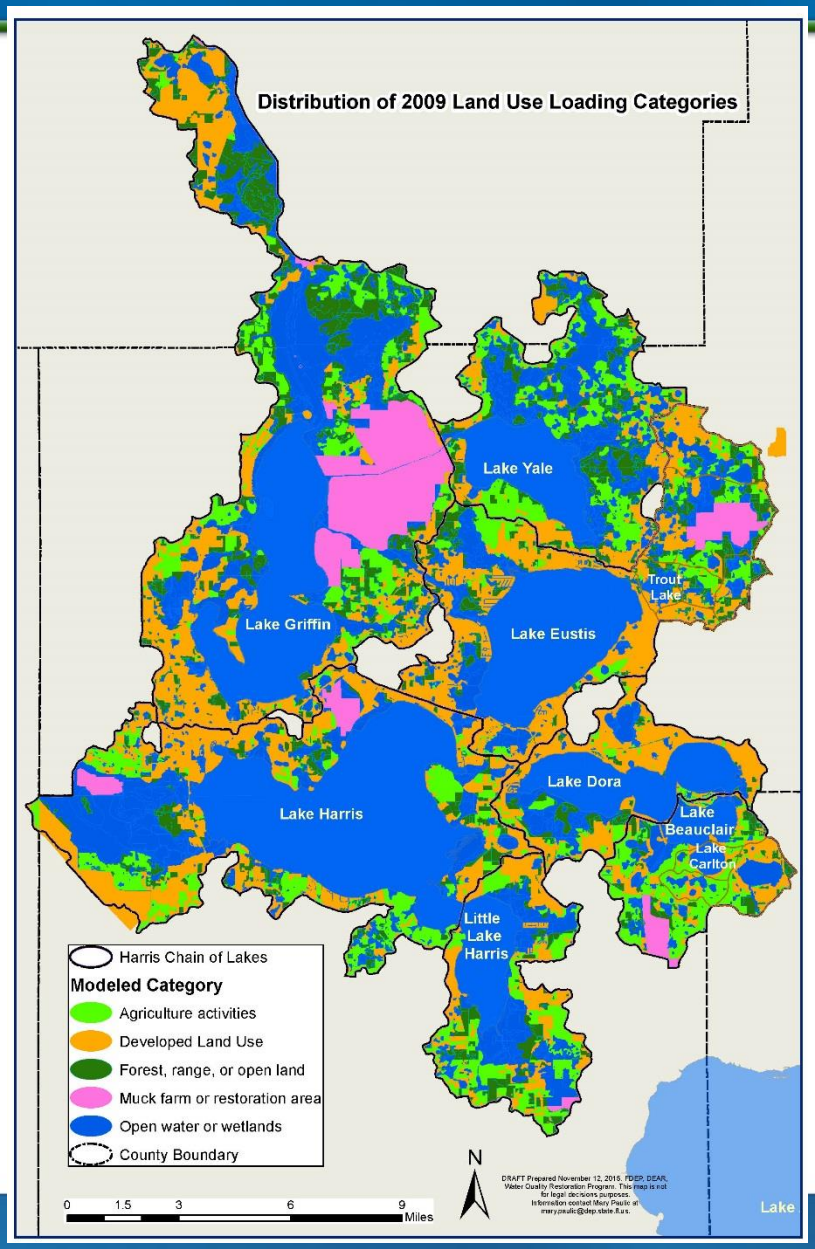
Lake	TP TMDL lbs/yr	TP Load Based on 2009 Land Use (lbs/yr)	TP Reduction Needed (lbs/yr)
Lake Carlton	195	478	260
Trout Lake	521	2,603*	2,082
Lake Harris	18,302	22,193	3,607
Lake Yale	2,844	3,692	848

*Current adopted TMDL loading from 1995 land use.

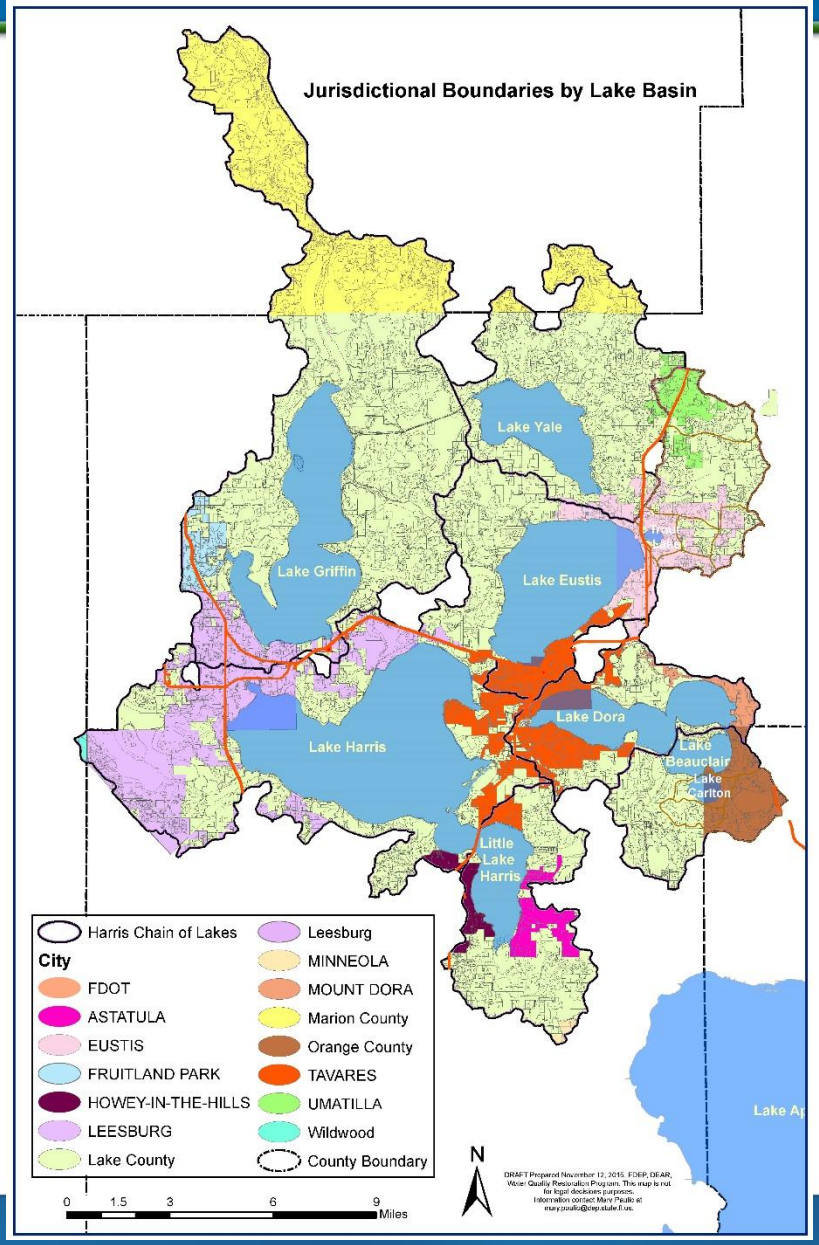
Summary of Approach

- Reductions are based on developed area within each jurisdiction and FDOT area.
  - Same approach as Palatlakaha River.
- Total Reduction = Developed Land Uses + Portion of Septic System Loading.
  - Septic system load reduction still needs to be apportioned by jurisdiction.
- Trout Lake numbers in development.
- Source loading calculation spreadsheets.
  - Partition loading among controllable sources.
  - Accounted for existing stormwater project credits before apportioning.
    - Calculation needs to be checked.

Harris Chain of Lakes



Jurisdictions in the Harris Chain of Lakes



Land Use Distribution

		Acres of Each Land Use Category By Lake and Jurisdiction				
Lake	City	Developed	Forest	Agriculture	Water/Wetlands	Muck Farm
Harris	Astatula	450.20	93.77	426.68	526.51	-
Harris	FDOT	243.26	27.71	25.22	39.54	-
Harris	Howey-in-the-Hills	335.34	91.43	372.33	127.47	
Harris	Lake County	5263.42	2556.06	4596.92	23207.88	-
Harris	Leesburg	4112.22	1006.12	1004.67	5197.63	398.88
Harris	Tavares	1036.08	265.08	687.62	521.69	-
Harris	Wildwood	19.37	-	92.84	0.81	-
Harris	Minneola	-	69.53	96.07	-	0.93
Yale	Eustis	343.25	113.55	102.13	81.75	-
Yale	FDOT	48.08	0.23	0.14	1.47	-
Yale	Lake County	1647.49	2657.66	3217.34	8976.72	-
Yale	Marion County	466.48	454.81	760.87	911.34	-
Yale	Umatilla	169.84	54.07	72.10	77.50	-
Trout	Eustis	865.85	623.90	380.10	700.59	1.96
Trout	FDOT	45.14	0.86	1.17	0.74	-
Trout	Lake County	882.45	1166.27	940.53	1436.70	1032.30
Trout	Umatilla	730.83	176.20	240.59	463.79	-
Carlton	FDOT	15.86	0.78	-	0.19	-
Carlton	Lake County	153.94	20.88	343.91	327.18	-
Carlton	Orange County	730.84	283.82	581.68	759.36	-

Jurisdiction Percent Developed Land Uses

Acres of Developed Land Uses by Jurisdiction and Lake.				
Lake	City	Acres Developed	Portion of Watershed	Percent of Area
Harris	Astatula	450.20	0.0393	3.9%
Harris	FDOT	243.26	0.0212	2.1%
Harris	Howey-in-the-Hills	335.34	0.0293	2.9%
Harris	Lake County	5263.42	0.4593	45.9%
Harris	Leesburg	4112.22	0.3588	35.9%
Harris	Tavares	1036.08	0.0904	9.0%
Harris	Wildwood	19.37	0.0017	0.2%
Harris	Minneola	Not applicable	-	-
Yale	Eustis	343.25	0.1283	12.8%
Yale	FDOT	48.08	0.0180	1.8%
Yale	Lake County	1647.49	0.6159	61.6%
Yale	Marion County	466.48	0.1744	17.4%
Yale	Umatilla	169.84	0.0635	6.3%
Trout	Eustis	865.85	0.3430	34.3%
Trout	FDOT	45.14	0.0179	1.8%
Trout	Lake County	882.45	0.3496	35.0%
Trout	Umatilla	730.83	0.2895	29.0%
Carlton	FDOT	15.86	0.0176	1.8%
Carlton	Lake County	153.94	0.1709	17.1%
Carlton	Orange County	730.84	0.8115	81.1%

Source Calculations: Lake Yale

Sources of TP (loading in lbs/yr)	Estimated load change from growth (2009 land uses)	Net estimated TP load-2009	TMDL controllable baseline loading	Controllable baseline % contribution	Proportional reduction needed to meet TMDL**
Atmospheric deposition (wet/dry)	0	1443			
Point sources	0	0		0	
Stormwater runoff					
Natural area runoff	53	609			
Agricultural runoff	164	361	361	22.01%	187
Runoff from developed uses	95	693	693	42.26%	358
YALE04 Lake Yale Priority Reuse					0
project 2					0
project 3					0
project 4					0
project 5					0
Hazardous waste sites					0
Seepage/groundwater					0
Septic tanks	294	586	586	35.73%	303
project 1					
project 2					
project 3					
project 4					
project 5					
Loading information					
Total P-loading (lbs/yr)	606	3692			3692
Total Maximum Daily Load (lbs/yr)		2844			2844
Reduction needed in P-loading (lbs/yr)		**848**			**848**

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Summary Tables

- Handouts for review.


• Any comments or questions???